CLAIMS

1. A hydrogen generating method for generating hydrogen-containing gas by decomposing fuel containing an organic compound, the method comprising providing a fuel electrode in contact with one surface of a partition membrane, supplying fuel containing an organic compound and water to the fuel electrode and providing an oxidizing electrode in contact with the other surface of the partition membrane, supplying an oxidizing agent to the oxidizing electrode, wherein fuel containing the organic compound is decomposed and hydrogen-containing gas is generated on the fuel electrode.

2. The hydrogen generating method as described in Claim 1 whereby it is possible to generate hydrogen-containing gas under open-circuit condition where no electric energy is withdrawn to outside from a hydrogen generating cell constituting a hydrogen generating system, and no electric energy is supplied from outside to the hydrogen generating cell.

3. The hydrogen generating method as described in Claim 1 whereby it is possible to generate hydrogen-containing gas on the fuel electrode by decomposing fuel containing an organic compound while withdrawing electric energy to outside from the hydrogen generating cell with the fuel electrode serving as a negative electrode and the oxidizing electrode as a positive electrode.

4. The hydrogen generating method as described in Claim 1 whereby it is possible to generate hydrogen-containing gas on the fuel electrode by decomposing fuel containing the organic compound while providing electric energy from outside to the hydrogen generating cell with the fuel electrode serving as cathode and the oxidizing electrode as anode.

5. The hydrogen generating method as described in any one of Claims 1 to 4 wherein the organic compound is alcohol.

6. The hydrogen generating method as described in Claim 5 wherein the alcohol is methanol.

7. The hydrogen generating method as described in any one of Claims 1 to 4 wherein the oxidizing agent is gas containing oxygen, or oxygen.

8. The hydrogen generating method as described in Claim 5 wherein the oxidizing agent is gas containing oxygen, or oxygen.

9. The hydrogen generating method as described in any one of Claims 1 to 4 wherein the oxidizing agent is liquid containing hydrogen peroxide.

10. The hydrogen generating method as described in Claim 5 wherein the oxidizing agent is liquid containing hydrogen peroxide.

11. A hydrogen generating system for generating hydrogen-containing gas by decomposing fuel containing an organic compound, the system comprising a partition

membrane, a fuel electrode provided on one surface of the partition membrane, means for supplying fuel containing an organic compound and water to the fuel electrode, an oxidizing electrode provided on the other surface of the partition membrane, means for supplying an oxidizing agent to the oxidizing electrode, and means for generating hydrogen-containing gas on the fuel electrode to collect the gas.

12. The hydrogen generating system as described in Claim 11 which exists as an open circuit, having neither means for withdrawing electric energy to outside from a hydrogen generating cell constituting the hydrogen generating system, nor means for providing electric energy from outside to the hydrogen generating cell.

13. The hydrogen generating system as described in Claim 11 which has means for withdrawing electric energy from the hydrogen generating cell to outside with the fuel electrode serving as a negative electrode and the oxidizing electrode as a positive electrode.

14. The hydrogen generating system as described in Claim 11 which has means for providing electric energy from outside with the fuel electrode serving as cathode and the oxidizing electrode as anode.

15. The hydrogen generating system as described in Claim 11 wherein voltage between the fuel electrode and the oxidizing electrode is 200 to 1000 mV.

16. The hydrogen generating system as described in

Claim 12 wherein voltage between the fuel electrode and the oxidizing electrode is 300 to 800 mV.

17. The hydrogen generating system as described in Claim 13 wherein voltage between the fuel electrode and the oxidizing electrode is 200 to 600 mV.

18. The hydrogen generating system as described in Claim 13 wherein voltage between the fuel electrode and the oxidizing electrode and/or the evolution volume of hydrogen-containing gas are/is adjusted by varying the volume of electric energy withdrawn from the hydrogen generating unit.

19. The hydrogen generating system as described in Claim 14 wherein voltage between the fuel electrode and the oxidizing electrode is 300 to 1000 mV.

20. The hydrogen generating system as described in Claim 14 wherein voltage between the fuel electrode and the oxidizing electrode and/or the evolution volume of hydrogen-containing gas are/is adjusted by varying the volume of electric energy provided.

21. The hydrogen generating system as described in any one of Claims 11 to 20 wherein the evolution volume of hydrogen-containing gas is adjusted by varying voltage between the fuel electrode and the oxidizing electrode.

22. The hydrogen generating system as described in any one of Claims 11 to 20 wherein voltage between the fuel electrode and the oxidizing electrode and/or the evolution volume of hydrogen-containing gas are/is adjusted by

varying the supply volume of the oxidizing agent.

23. The hydrogen generating system as described in any one of Claims 11 to 20 wherein voltage between the fuel electrode and the oxidizing electrode and/or the evolution volume of hydrogen-containing gas are/is adjusted by varying the concentration of the oxidizing agent.

24. The hydrogen generating system as described in Claim 22 wherein voltage between the fuel electrode and the oxidizing electrode and/or the evolution volume of hydrogen-containing gas are/is adjusted by varying the concentration of the oxidizing agent.

25. The hydrogen generating system as described in any one of Claims 11 to 20 wherein voltage between the fuel electrode and the oxidizing electrode and/or the evolution volume of hydrogen-containing gas are/is adjusted by varying the supply volume of fuel containing an organic compound and water.

26. The hydrogen generating system as described in Claim 22 wherein voltage between the fuel electrode and the oxidizing electrode and/or the evolution volume of hydrogen-containing gas are/is be adjusted by varying the supply volume of fuel containing an organic compound and water.

27. The hydrogen generating system as described in Claim 23 wherein voltage between the fuel electrode and the oxidizing electrode and/or the evolution volume of hydrogen-containing gas are/is adjusted by varying the

supply volume of fuel containing an organic compound and water.

28. The hydrogen generating system as described in any one of Claims 11 to 20 wherein voltage between the fuel electrode and the oxidizing electrode and/or the evolution volume of hydrogen-containing gas are/is adjusted by varying the concentration of fuel containing an organic compound and water.

29. The hydrogen generating system as described in Claim 22 wherein voltage between the fuel electrode and the oxidizing electrode and/or the evolution volume of hydrogen-containing gas are/is adjusted by varying the concentration of fuel containing an organic compound and water.

30. The hydrogen generating system as described in Claim 23 wherein voltage between the fuel electrode and the oxidizing electrode and/or the evolution volume of hydrogen-containing gas are/is adjusted by varying the concentration of fuel containing an organic compound and water.

31. The hydrogen generating system as described in Claim 25 wherein voltage between the fuel electrode and the oxidizing electrode and/or the evolution volume of hydrogen-containing gas are/is adjusted by varying the concentration of fuel containing an organic compound and water.

32. The hydrogen generating system as described in

any one of Claims 11 to 20 wherein the operation temperature is not higher than 100°C.

33. The hydrogen generating system as described in Claim 32 wherein the operation temperature is between 30 and 90°C.

34. The hydrogen generating system as described in Claim 21 wherein the operation temperature is not higher than 100°C.

35. The hydrogen generating system as described in Claim 22 wherein the operation temperature is not higher than 100°C.

36. The hydrogen generating system as described in Claim 23 wherein the operation temperature is not higher than 100°C.

37. The hydrogen generating system as described in claim 25 wherein the operation temperature is not higher than 100°C.

38. The hydrogen generating system as described in Claim 28 wherein the operation temperature is not higher than 100°C.

39. The hydrogen generating system as described in any one of Claims 11 to 20 wherein the partition membrane is a proton conducting solid electrolyte membrane.

40. The hydrogen generating system as described in Claim 39 wherein the proton conducting solid electrolyte membrane is a perfluorocarbon sulfonate-based solid electrolyte membrane.

41. The hydrogen generating system as described in Claim 32 wherein the partition membrane is a proton conducting solid electrolyte membrane.

42. The hydrogen generating system as described in any one of Claims 33 to 38 wherein the partition membrane is a proton conducting solid electrolyte membrane.

43. The hydrogen generating system as described in any one of Claims 11 to 20 wherein the catalyst applied to the fuel electrode is made of platinum-ruthenium alloy supported by carbon powder serving as a base.

44. The hydrogen generating system as described in Claim 32 wherein the catalyst applied to the fuel electrode is made of platinum-ruthenium alloy supported by carbon powder serving as a base.

45. The hydrogen generating system as described in any one of Claims 33 to 38 wherein the catalyst applied to the fuel electrode is made of platinum-ruthenium alloy supported by carbon powder serving as a base.

46. The hydrogen generating system as described in Claim 39 wherein the catalyst applied to the fuel electrode is made of platinum-ruthenium alloy supported by carbon powder serving as a base.

47. The hydrogen generating system as described in any one of Claims 11 to 20 wherein the catalyst applied to the oxidizing electrode is made of platinum supported by carbon powder serving as a base.

48. The hydrogen generating system as described in

Claim 32 wherein the catalyst applied to the oxidizing electrode is made of platinum supported by carbon powder serving as a base.

49. The hydrogen generating system as described in any one of Claims 33 to 38 wherein the catalyst applied to the oxidizing electrode is made of platinum supported by carbon powder serving as a base.

50. The hydrogen generating system as described in Claim 39 wherein the catalyst applied to the oxidizing electrode is made of platinum supported by carbon powder serving as a base.

51. The hydrogen generating system as described in claim 43 wherein the catalyst applied to the oxidizing electrode is made of platinum supported by carbon powder serving as a base.

52. The hydrogen generating system as described in any one of Claims 11 to 20 comprising means for circulating fuel containing an organic compound and water.

53. The hydrogen generating system as described in Claim 32 comprising means for circulating fuel containing an organic compound and water.

54. The hydrogen generating system as described in any one of Claims 33 to 38 comprising means for circulating fuel containing an organic compound and water.

55. The hydrogen generating system as described in any one of Claims 11 to 20 comprising a carbon dioxide absorbing portion for absorbing carbon dioxide contained in

the hydrogen-containing gas.

56. The hydrogen generating system as described in Claim 32 comprising a carbon dioxide absorbing portion for absorbing carbon dioxide contained in the hydrogen-containing gas.

57. The hydrogen generating system as described in any one of Claims 33 to 38 comprising a carbon dioxide absorbing portion for absorbing carbon dioxide contained in the hydrogen-containing gas.